

STANDING STONE

WILBER STOUT

Rock Mill, Lancaster, Ohio

Standing Stone, most certainly an appropriate name, was given to this conspicuous rock at Lancaster by the Wyandot Indians who belonged to the strong Shawnee Confederacy. To them this abrupt cliff of sandstone was the work of the Great Spirit and assured protection to the wigwams pitched on the plains below and ruled over by the mighty chieftain Tarhe, or the Crane. When visited by scouts from Marietta in 1790 Tarhe Town or Crane Town is said to have contained about 100 wigwams and some 500 souls. This place was also the meeting point of two important trails to distant villages (Gates). The chief of these was the Coshocton Trail which began at Shawnee Town on the Ohio River at Portsmouth, led past the salt springs at Jackson and the caves of the Hocking hills to Tarhe Town at the Standing Stone, then on past the flint quarries on Flint Ridge to the Delaware Indian center at Coshocton. The other trail, less lengthy, coursed southwestward over the hills past Amanda and across the Pick-away Plains to the chief Shawnee towns near Chillicothe where it joined the Scioto Trail or Warrior's Path. The imposing rock, Standing Stone, thus meant much to the Indians and probably also to the Mound Builders in the more distant past. Recently it has been the inspiration for narratives and movie scenes and now provides the pleasures of a fine public park. This leads to the question: what is the story of the rock formation, Standing Stone, as visioned by the geologist?

DEPOSITION OF SANDSTONE

Millions of years ago during what is known to geologists as the Mississippian age large rivers were carrying vast quantities of sand and silt into an ancient sea which then occupied much of what is now the central portion of the United States. There the waves, tides, and currents of the ocean worked the suspended matter over and over, floating away to the deeper, more quiet waters the finer parts but depositing the coarser materials, sand with some pebbles, on or along the beaches. The final result of all this action was to deposit a vast sheet of sand and pebbles varying in thickness from a few to 300 feet or more.

This formation as now outlined by geologists extends from Lancaster south to the Hocking-Vinton county line, north to Mansfield, Richland County, east into West Virginia and west to near Amanda. This stratum of sandstone is known as the Black Hand, a name given by L. E. Hicks, in 1878, to the deposit of coarse sandstone and conglomerate so well exposed at the Black Hand rock and in the gorge of the Licking River near Hanover. To the driller of petroleum and natural gas in southeastern Ohio and in northern West Virginia this reservoir of the hydrocarbons is known as the Big Injun Sand.

MARINE ORIGIN OF THIS ROCK

The question arises: what determines the marine origin of the Black Hand formation? Although this sandstone bears no or few fossils the shales above and below it and those that replace the deposit laterally yield many fine specimens of shell life that lived in this ancient sea. Our museums contain collections of the varied animal forms that existed during the Mississippian age.

SOURCE OF SAND AND PEBBLES

Another question may be asked with propriety: what was the original source of the sand and pebbles? Both materials are composed largely of the mineral

quartz and were derived from the weathering and disintegration of the older crystalline rocks such as granite, gneiss, and schist. These when reduced by decay and sorted by water yielded silts or muds consolidated to shale, sand to sandstone, and pebbles to conglomerate. Hence the sand and pebbles in the Black Hand formation came from the old crystalline rocks on highland areas where they were broken down by various weathering agencies. The materials thus derived were carried away by streams and the coarser matter finally deposited along the shore of the ocean to form such beds as the Black Hand.

CRUSTAL MOVEMENTS

A crustal movement of long duration and of much importance geologically was a very slow sinking of the floor of the sea into a trough-like basin known as the Appalachian geosyncline or Appalachian trough. The axis or deep part of this depression extended from Alabama northeastward into New York. However, as the ocean floor in this basin sank slowly the forces of deposition or of rock building were bringing in materials to form shales, sandstones, limestones, coals, clays,



and iron ores, all of much worth. For example, through such deposition and burial the Black Hand formation, so well represented by Standing Stone at Lancaster, is covered by some 960 feet of other rocks at Pomeroy, 1,400 feet at Marietta, and 1,500 feet at Woodsfield. In general the dip of the Black Hand formation is not far from 20 feet per mile east and 12 feet per mile south. Thus, these movements in the earth's crust caused changes in dip of the rocks and allowed for the accumulation of a thick mass of strata.

APPALACHIAN REVOLUTION

Again the question may be asked: why does the Black Hand sandstone, laid down in the sea and buried by other rocks, now appear at the surface in great cliffs and hills across central Ohio from South Bloomingville, Hocking County, through Lancaster and Newark to Mansfield in Richland County? The Permian age of the geologist was "brought to a close by one of the most profound physical disturbances in the history of North America. It has been called the Appalachian Revolution because at that time the Appalachian Mountain Range was born out of the sea by upheavals and folding of the strata" (Miller). The great forces of nature thus created mountain ranges, lifted large areas into plateau-like highlands and raised other parts into broad plains. Such events elevated our region above the sea and opened the way for the next cycle, which is that of land sculpturing.

LAND PROVINCES

The land provinces of most interest to us consist of the Appalachian Mountains, the Allegheny Plateau, and the Mississippi Valley Plain. The Appalachian Mountains, with broken and contorted rocks in great ridges, extends across the eastern part of the United States from Georgia to Maine. As defined the next province, the Allegheny Plateau, embraces the highlands or hill country west of the mountain terrain and east of the central lowlands. The boundary between plateau and plain is marked by an abrupt or stair-step wall of rocks known as the Allegheny Escarpment or Front in Ohio and as the Highland Rim in Kentucky and Tennessee. This drop from the ridge tops of the hills to the flat land of the plains varies much but commonly in this region is from 325 to 400 feet. Near Lancaster good examples of this escarpment or wall are from Chestnut Ridge to the flats near Jefferson, from Lithopolis to the lowlands near Groveport, and from Ringgold to the Pickaway Plains near Circleville. The height of the Allegheny Escarpment is approximated by the wall of rock of Standing Stone.

The Mississippi Valley Plain embraces the low-lying basin extending westward from the Allegheny Plateau to the Rocky Mountains. Here the land is flat or gently rolling and often swampy with immature drainage. The northern part of Fairfield County belongs in the province of the Mississippi Valley Plain and the remainder in that of the Allegheny Plateau.

ANCIENT STREAMS-TEAYS SYSTEM

During the long interval from Permian time, when the Appalachian Revolution took place, to the present the destructive forces of weathering and erosion have eaten away the moderately level Allegheny Plateau into rugged hills and deep valleys and have lowered it somewhat in elevation. At this time it was reduced much to its present form. Thus aside from rock disintegration by weathering agencies, the chief forces in dissecting this old surface were streams, both large and small.

As far as known to geologists the first streams to affect the western part of the Allegheny Plateau were those of what is called the Teays System. The master stream—the Teays River—entered Ohio near Wheelersburg, Scioto County, flowed northwestward past Waverly, Chillicothe, London, Springfield, and Celina and entered Indiana south of the village of Willshire, Van Wert County. The stream bed of the Teays River is clearly marked by wide level flats from Wheelersburg to Chillicothe and by a deep trench filled with drift from the latter place to the Ohio-Indiana line.

Like present streams the Teays River had many branches. One of these was a large tributary known as the Groveport River which was about 150 miles in length and drained a wide basin in east central Ohio. In turn the Groveport River had a southern branch known as the Logan River. The latter stream rose south of Logan, flowed northward past Logan, Enterprise, Rock Bridge, Sugar Grove, Lancaster, and Hooker and united with the Groveport River near Carroll. The marks of the Logan River have been somewhat modified by later changes but in the main, especially in Fairfield County, the valley cut through the Black Hand sandstone and other rocks was the work of this old river of the Teays Stage. At Lancaster the floor of the Logan River stood at an elevation not far from 690 feet or some 140 feet below the level of the main part of the city. Hence here during this time the valley was broad and deep and the bordering hills were more than 400 feet in height and bold in relief. In the vicinity of Lancaster additional modifications of the surface features were caused by Bremen Creek, an eastern tributary with several branches, which had carved out a wide valley and thus aided in sculpturing the adjacent hills.

Consequently during the long interval of time from the Appalachian Revolution,

near the close of the Permian age, to the advent of the great glaciers, during the Pleistocene era, the Teays Stage streams cut deep valleys into the rock surface of the Allegheny Plateau and thereby shaped up the hills and ridges into much their present forms. Where resistant rocks as the Black Hand sandstone lay near the surface—especially near the Allegheny Escarpment—many sheer cliffs and isolated knobs remain as a result of ages of work by destructive forces in dissecting the original sheet deposit. Standing Stone shaped up largely during this cycle of surface alteration represents simply the point of a hill cut off from the main ridge by stream erosion, aided by weathering agencies.

GLACIATION

The great glaciers of Pleistocene time brought changes of importance to the surface features of Ohio. These ice sheets, three in number, left a blanket of material called drift over some 30,000 square miles of the State. The drift consists of disintegrated rocks and old soils which were reduced in size from rock flour to huge boulders, and all gathered along the way from the Canadian Highlands to the final place of deposition. In general most of it was gathered within 25 miles of where deposited. In this State the average thickness of drift in the areas affected is between 35 and 40 feet. The accumulations vary from one foot or less to 500 feet or more. Such deposits of glacial debris softened the surface features by fills in the valleys and by rounding out the outlines of the hills. Another change of importance, but less apparent, caused by the ice sheets was on the drainage patterns of the stream systems. Some streams were wiped out completely whereas others were modified by reversal of their courses, by cutting new channels locally, or by deepening older ones. The area around Lancaster was profoundly modified both by the mantles of drift left by two ice sheets and by the radical changes in the drainage systems.

KANSAN OR PRE-KANSAN GLACIER

As far as known the first glacier to reach Ohio was the Kansan or Pre-Kansan the marks of which are much obscured by later ice invasions. This early glacier appears to have advanced southward from the Canadian Highlands to about midway across Ohio. South of the ice front its chief effect was to dam the Teays River somewhere in the west central part of the State and thereby to create new outlets for the water from the old drainage basin and from that added by the melting glacier. The wall of ice thus ponded the water in the valleys of the old Teays streams into long finger lakes which eventually flooded over and initiated a new drainage system much different from the former. Collectively the new streams thus originated are known as the Deep Stage drainage.

DEEP STAGE DRAINAGE—NEWARK RIVER

In central Ohio the master stream of the Deep Stage system was the Newark River. It rose east of Dover, flowed southwestward past Newcomerstown, Coshocton, Newark, Groveport, Circleville, Chillicothe, and Waverly to Portsmouth and there joined the Pomeroy River to form the Cincinnati River which flowed on westward past that city. The streams of this period cut deep valleys, 80 to 100 feet or more below the old Teays levels, hence the name Deep Stage drainage. The rock floor of the old Newark River, now deeply buried, has an elevation above sea of approximately 500 feet at Chillicothe, 520 feet at Circleville, 550 feet at Canal Winchester, and 594 feet at Newark. At present this old river bed is buried by 200 to 300 feet or more of glacial drift and on this account affords a fine water supply.

Of particular interest in this account of Standing Stone is a southern tributary of the Newark River of Deep Stage time known as the Lancaster River. The latter stream rose south of Haydenville, flowed northward past Logan and Lan-

caster, and joined the master stream near Canal Winchester. The new stream, Lancaster River, occupied much the same basin and bed as the older Logan River and had tributaries similarly located. However, during this period of erosion the Lancaster River cut the rock floor some 100 feet deeper into the soft shales under the Black Hand formation, widened the valley of the former stream to some extent, and formed more abrupt walls in the bordering resistant massive sandstone. The undercutting in the soft shale below the sandstone formed the cliff. Assuredly most of the work in carving out the great rock, Standing Stone, was done by the Logan River of Teays Stage time and then largely finished by the Lancaster River in the Deep Stage period. Many other knobs and isolated groups of hills in this vicinity also resulted from the dissection of the vast sheet deposit of Black Hand sandstone during these two cycles of erosion. Standing Stone is simply an outstanding example.

ILLINOIAN GLACIER

Again glaciation prevailed in Ohio. The second ice invasion known as the Illinoian covered the central and the western parts of the State and left a terminal moraine definitely marked from Brinkhaven southward past Hanover, Fultonham, Sugar Grove, Chillicothe, and Cynthiana to the Ohio River at Ripley. It not only covered some 23,000 square miles of Ohio with glacial debris but caused radical changes in the drainage systems in the remaining portion.

POST-ILLINOIAN DRAINAGE—HAYDEVILLE RIVER

New streams were now formed through the influence of this ice sheet. At this time the headwaters of the north-flowing Lancaster River were trapped by the ice border standing across the valley at Sugar Grove. The accumulated waters of the basin, thus ponded, found an outlet over a low divide near the Athens-Hocking County line, flowed down the valley of Stewart Creek of Deep Stage time, and united with the new major stream, the northeastward-flowing New Martinsville River. For definition the new stream formed from part of the old Lancaster River and from others is called the Haydenville River. It flowed southward from Sugar Grove past Logan, Haydenville, and Athens to Hockingport and outlined, with little subsequent modifications, that of the present Hocking River.

North of the terminal moraine at Sugar Grove the chief effect of the Illinoian glacier was to fill to some extent the deeply cut valleys of the Lancaster River and its tributaries and to blanket the bordering hills with a thin coating of rock debris. Probably this mass of ice in passing over Standing Stone scoured its walls to some extent but certainly it had little to do with shaping the great rock.

WISCONSIN GLACIER

The last ice sheet to invade Ohio, some 30,000 years ago, was the Wisconsin, the deposits of which are very apparent over approximately 26,460 square miles of the State. It made many changes in the surface features, leveling certain areas to a smooth, even plain, piling up drift in others to knobby hills and billowy ridges, and filling certain valleys with great quantities of outwash materials. In Fairfield County the Wisconsin glacier lacked a few miles of extending as far south as the Illinoian. The terminal moraine or border of the last ice passed irregularly through southeastern Richland, northern Berne, southeastern Hocking, and northwestern Madison townships. This glacier certainly passed over Standing Stone as a granite boulder of Canadian origin still remains upon the summit. However, the ice did little in sculpturing the walls of the great rock, yet it left a mantle of drift around the base of this hill as well as over the surrounding countryside. In general in the Lancaster region the chief effect of the Wisconsin glacier was to add more accumulations to that already deposited by the Illinoian ice, to the fill in the old Logan and Lancaster River valleys. A result of regional

importance of this cycle of glaciation was the inauguration of a new system of drainage known as the Post-Wisconsin.

POST-WISCONSIN DRAINAGE—PRESENT STREAMS

In this paper only the streams of the Post-Wisconsin system in the Lancaster region need be considered. Since the Haydenville River of the Post-Illinoian cycle was largely beyond the front of the Wisconsin glacier the water from the melting ice simply found an outlet through this well cut valley. The present Hocking River is therefore only a slightly modified form of the older Haydenville River. As the ice receded the new Hocking River extended its headwaters out onto the glacial plain to the northern part of the county. The present stream has had no evident effect on Standing Stone. The modifications on the rock, in the 30,000 years since glaciation, have been through weathering, case-hardening parts of the surface by cementation, and disintegration in places of some of the more impure rock.

SUMMARY

Standing Stone remains as a monument to many forces and events in a long story mainly explained by geology. The occurrences may be recorded as follows:

1. A thick body of sandstone, now known as the Black Hand formation, was laid down along the shore of the sea.
2. Through slow sinking of the ocean floor a great mass of other rocks were deposited above the Black Hand sandstone.
3. Next during profound earth movements, called the Appalachian Revolution, these rocks were raised to a land mass much above the sea.
4. Rains fell and streams then began the work of cutting valleys in the land. The first system of streams, named the Teays, carved deep troughs and basins in the rock surface and shaped up the higher parts into hills and ridges.
5. One of the Teays streams, the Logan River, cut a wide, deep valley northward past Lancaster and shaped up Standing Stone from the thick Black Hand sandstone. The main part of the work in reducing the rock to its present form was done at this time.
6. An early glacier, the Kansan or Pre-Kansan, buried or changed these early streams but led to the formation of a new river system, known as the Deep Stage.
7. One of these was the Lancaster River which flowed northward in the trough of the older Logan River but cut some 90 feet deeper into the rocks below.
8. The Lancaster River evidently aided in forming the abrupt walls of Standing Stone as it eroded away the soft shales from under the massive, resistant sandstone formation.
9. The second glacier, the Illinoian, passed over the Lancaster area and on southward to Sugar Grove. It scoured the walls of Standing Stone to some extent and left a thick deposit of drift around its base.
10. The Illinoian drift wiped out or modified many of the older streams. As affecting the Lancaster region the chief new stream formed was the Haydenville River which flowed southward from the ice front for an outlet to the sea. This stream had little or no effect on Standing Stone.
11. The third glacier in Ohio, the Wisconsin, passed southward over Standing Stone and beyond Lancaster. It made little change in the rock structure but added more drift around its base.
12. The Wisconsin ice invasion then led to the formation of the now existing system, the Hocking River and its tributaries. Standing Stone has not been affected by the present streams.

Hence, Standing Stone, an isolated knob of Black Hand sandstone, was formed mainly by the cutting of valleys by two old streams, the Logan and the Lancaster rivers, and its walls were scoured by two glaciers, the Illinoian and the Wisconsin. This rock named so appropriately by the Indians certainly merits a prominent place in the scenic features of Ohio.